

DNN based algorithm for CMS Level-1 muon reconstruction

Monday, December 10, 2018 2:30 PM (30 minutes)

In order to preserve its ability to do physics at the electroweak scale in the HL-LHC era, CMS experiment has to maintain low trigger thresholds that are robust against high intensity and large number of interactions per bunch crossing expected at the HL-LHC. Specifically, the muon trigger transverse momentum (p_T) thresholds currently used cannot be maintained at the HL-LHC without improving the reconstruction algorithms and incorporating additional information into the L1 muon reconstruction. The biggest challenge in L1 muon reconstruction is the ability to have highly accurate determination of the muon p_T in order to prevent lower transverse momentum muons, below the desired threshold, from saturating the trigger rate. We present studies of an alternative novel technique to improve L1 muon momentum resolution using advanced Machine Learning algorithms executed in FPGAs. The presentation will include simulation based studies to quantify performance improvements and bottlenecks of such a technique as well as a preliminary implementation of firmware with the goal of estimating required resources and latency.

Primary author: LOW, Jia (University of Florida)

Co-author: JINDARIANI, Sergo (FNAL)

Presenter: LOW, Jia (University of Florida)

Session Classification: Parallel Session: Computing & Machine Learning

Track Classification: Computing